

# Material characterisation

## Optical Microscope

| Type of equipment         | Name of equipment              | Location | Contact person                     | Link to more information          |
|---------------------------|--------------------------------|----------|------------------------------------|-----------------------------------|
| Optical microscope        | Wild Heerbrugg                 | A-443    | <a href="#">Trygve L. Schanche</a> |                                   |
| Optical microscope        | Leica MEF4M                    | E-514    | <a href="#">Trygve L. Schanche</a> |                                   |
| Optical microscope        | Reichert-Jung Univar           | E-514    | <a href="#">Trygve L. Schanche</a> |                                   |
| Optical microscope        | Makroskop Leitz M400           | E-508    | <a href="#">Trygve L. Schanche</a> |                                   |
| Optical microscope        | Leitz MM6                      | E-508    | <a href="#">Trygve L. Schanche</a> |                                   |
| Optical microscope        | Zeiss Axiovert 25              | E-508    | <a href="#">Trygve L. Schanche</a> | <a href="#">Zeiss Axiovert 25</a> |
| Optical microscope        | Leitz metalloplan              | E-508    | <a href="#">Trygve L. Schanche</a> |                                   |
| Optical microscope        | Leitz 1A                       | E-508    | <a href="#">Trygve L. Schanche</a> |                                   |
| Optical microscope        | Reichert MEF1                  | E-508    | <a href="#">Trygve L. Schanche</a> |                                   |
| Optical microscope        | Leitz Metallux 3               | E-514A   | <a href="#">Trygve L. Schanche</a> | <a href="#">Leitz Metallux 3</a>  |
| Videokamera (2 stk)       | JVC TK-S310 EG                 | KII-014  | <a href="#">Trygve L. Schanche</a> |                                   |
| Videokamera til mikroskop | Leica R3 electr.               | E-514A   | <a href="#">Trygve L. Schanche</a> |                                   |
| Optical microscope        | Leitz Axioskop                 | E-514A   | <a href="#">Trygve L. Schanche</a> | <a href="#">Leitz Axioskop</a>    |
| Optical Microscope        | Nikon SM2800                   | KII-323  | Eli Beate Larsen                   |                                   |
| Optical Microscope        | Leica DM IRM                   | KII-323  | Eli Beate Larsen                   |                                   |
| Optical microscope        | Zeiss                          | KII-003A | <a href="#">Magnus B. Følstad</a>  |                                   |
| Optical microscope        | Leica DMIL                     | KII-022  | <a href="#">Kara Poon</a>          |                                   |
| Optical microscope        | Olympus BH-2                   | KII-032A | Stein Rørvik (SINTEF)              |                                   |
| Optical microscope        | Reichert MeF3A med Sony kamera | KII-032A | Stein Rørvik (SINTEF)              |                                   |
| Optical microscope        | Olympus BX60                   | KII-032A | Stein Rørvik (SINTEF)              |                                   |
| Optical microscope        | Leica EZ4                      | KII-034B | <a href="#">Sergey Khromov</a>     |                                   |
| Optical microscope        | Wild Heerbrugg                 | KII-011  |                                    |                                   |
| Optical microscope 3D     | Alicona Infinite Focus         | KII-032A | <a href="#">Kara Poon</a>          |                                   |

## Electron microscope



[More information on SEM - TEM](#)

| Type of equipment            | Name of equipment   | Location | Contact person                 | Link to more information |
|------------------------------|---|----------|--------------------------------|--------------------------|
| Scanning Electron Microscopy | FE-SEM with Bruker EDS/NORDIF EBSD system<br>Hitachi SU6600 | F-362    | <a href="#">Yingda Yu</a>      |                          |
| Scanning Electron Microscopy | FE-SEM with Bruker EDS/NORDIF EBSD system<br>Zeiss Ultra 55 | F-362    | <a href="#">Yingda Yu</a>      |                          |
| Scanning Electron Microscopy | SEM with Nordif EBSD system<br>JEOL JSM 840A                | F-362    | <a href="#">Yingda Yu</a>      |                          |
| Scanning Electron Microscopy | SEM with Gatan CL system<br>JEOL JSM 840                    | F-369    | <a href="#">Yingda Yu</a>      |                          |
| Scanning Electron Microscopy | SEM with JEOL EDS system<br>JEOL JSM 6010LA                 | F-369    | <a href="#">Yingda Yu</a>      |                          |
| Scanning Electron Microscopy | FE-SEM with EDAX EDS system<br>Zeiss Supra 55VP             | F-369    | <a href="#">Yingda Yu</a>      |                          |
| Scanning electron microscopy | Hitachi S-3400N   | KII-036  | <a href="#">Sergey Khromov</a> |                          |

## Scanning probe microscope

| Type of equipment             | Name of equipment                             | Location | Contact person                    | Link to more information             |
|-------------------------------|---|----------|-----------------------------------|--------------------------------------|
| Electron Micro Probe Analyzer | FE-EPMA with JEOL WDS system<br>JEOL JXA 8500 | F-373    | <a href="#">Morten Raanes</a>     |                                      |
| Scanning probe microscope     | Agilent 5500 AFM/SPM microscope               | KII-003A | <a href="#">Magnus B. Følstad</a> | <a href="#">About the instrument</a> |

## Transmission electron microscopy

 [More information on SEM - TEM](#)

| Type of equipment         | Name of equipment | Location | Contact person            | Link to more information |
|---------------------------|-------------------|----------|---------------------------|--------------------------|
| TEM with Gatan GIF system | JEOL TEM 2010     | F-368    | <a href="#">Yingda Yu</a> |                          |

## Thermal analysis

| Type of equipment | Name of equipment                          | Location | Contact person                 | Link to more information  |
|-------------------|--|----------|--------------------------------|---|
| Thermal analysis  | DTA/TGA Setaram Sensis                     | A-K032   | Sarina Bao (SINTEF)            |   |
| Thermal analysis  | Electrical conductivity furnace            | KII-103  | <a href="#">Pei Na Kui</a>     |   |
| Thermal analysis  | NETZSCH dilatometer 402C, thermal analysis | KII-103  | <a href="#">Babak Khalaghi</a> | <a href="#">Dilatometer</a>   |
| Thermal analysis  | NETZSCH STA F3 449 Jupiter (Hugin)         | KII-103  | <a href="#">Babak Khalaghi</a> | <a href="#">Simultaneous Thermal Analysis</a>                                 |
| Thermal analysis  | NETZSCH STA C 449 Jupiter, (Munin)         | KII-103  | <a href="#">Babak Khalaghi</a> | <a href="#">Simultaneous Thermal Analysis combined with mass spectrometry</a> |
| Thermal analysis  | LINSEIS STA PT 1600, (Linseis)             | KII-103  | <a href="#">Babak Khalaghi</a> | <a href="#">Simultaneous Thermal Analysis</a>                                 |
| Thermal analysis  | NETZSCH dilatometer 402E                   | KII-103  | Ove Darell (SINTEF)            |   |
| Thermal analysis  | NETZSCH DSC 214 Polyma                     | KII-103  | <a href="#">Babak Khalaghi</a> | <a href="#">DSC 214 Polyma</a>  |
| Thermal analysis  | Optisk dilatometer-Expert system           | KII-103  | Anne Støre (SINTEF)            |   |
| Thermal analysis  | LFA Microflash, termisk diffusivitet       | KII-103  | Anne Støre (SINTEF)            |   |
| Thermal analysis  | Dilatometer                                | KII-303  | Anne Støre (SINTEF)            |   |

## Spectroscopy

| Type of equipment                           | Name of equipment   | Location | Contact person                    | Link to more information |
|---|---|----------|-----------------------------------|--------------------------|
| Spectroscopy                                | GD-OES  | KII-307  | <a href="#">Mariia Stepanova</a>  |                          |
| Spectroscopy Element Analysis               | GD-MS   | E-208    | <a href="#">Chiara Modanese</a>   |                          |
| Mass spectrometer + potensiostat            | Differential Electrochemical Mass Spectrometry (DEMS) station | KII-323  | <a href="#">Magnus B. Følstad</a> |                          |
| UV-vis/NIR spectrophotometer + potensiostat | Photoelectrochemical station                                  | KII-001  | <a href="#">Magnus B. Følstad</a> |                          |
| FTIR spectrometer                           | Bruker Vertex 80v   | KII-323  | <a href="#">Magnus B. Følstad</a> |                          |

|                  |                  |         |                   |  |
|------------------|------------------|---------|-------------------|--|
| Raman microscope | WITec alpha300 R | KII-323 | Magnus B. Følstad |  |
|------------------|------------------|---------|-------------------|--|

## Surface and particle analysis

| Type of equipment                        | Name of equipment                               | Location                | Contact person                    | Link to more information                                    |
|--|---|-------------------------|-----------------------------------|---|
| Surface and particle analysis            | PSA Malvern 2000                                | KII-107                 | <a href="#">Elin Albertsen</a>    |   |
| Surface and particle analysis            | TRISTAR 3000 surface area and porosity analyzer | KII-107                 | <a href="#">Elin Albertsen</a>    | <a href="#">BET</a>   |
| Surface and particle analysis            | Permeabilitet                                   | KII-303                 | Anne Støre (SINTEF)               |   |
| Zetapotential and particle size analyzer | Beckman Coulter DelsaNano C                     | <a href="#">KII-223</a> | <a href="#">Magnus B. Følstad</a> | <a href="#">Description, terms of use &amp; user manual</a> |
| Surface analyzer                         | Drop Shape Analyzer - DSA100                    | KII-321                 | Anita Storsve                     | <a href="#">Description</a>                                 |
| Laser scattering particle size analyzer  | Horiba LA-960 Partica                           | KII-107                 | <a href="#">Johannes Ofstad</a>   | <a href="#">Description</a>                                 |
| Micro Scratch Tester                     | ST Instruments B A                              | KII-321                 | Anita Storsve                     |   |

## XRD

 [More information about the XRD lab](#)

| Type of equipment | Name of equipment                                   | Location | Contact person                  | Link to more information           |
|-------------------|---|----------|---------------------------------|------------------------------------|
| XRD               | Routine Powder Diffractometer (DaVinci1)            | KII-113  | <a href="#">Contact person</a>  | <a href="#">Routine powder XRD</a> |
| XRD               | Powder diffractometer (D8 Focus)                    | KII-113  | <a href="#">Contact person</a>  | <a href="#">9-pos Powder XRD</a>   |
| XRD               | Siemens D5005 with monochromator (A-unit)           | KII-113  | <a href="#">Contact person</a>  | <a href="#">Siemens D5005</a>      |
| XRD               | Multipurpose Powder X-ray diffractometer (DaVinci2) | KII-113  | <a href="#">Contact person</a>  | <a href="#">Multipurpose XRD</a>   |
| XRD               | Non-ambient X-ray diffractometer (D8 Advance)       | KII-113  | <a href="#">Contact person</a>  | <a href="#">Non-ambient XRD</a>    |
| Texture Analysis  | X-ray diffractometer                                | A-347    | <a href="#">Håkon Wiik Ånes</a> | <a href="#">XRD</a>                |

## Solar cell silicon characterisation

| Type of equipment                              | Name of equipment                      | Location | Contact person                   | Link to more information |
|--|--|----------|----------------------------------|--------------------------|
| Si - Characterisation                          | Nicolet 6700 FT-IR                     | M-104    | <a href="#">Chiara Modanese</a>  |                          |
| Si - Characterisation                          | μLPCD resistivity life time measurment | M-104    | Gaute Stokkan (SINTEF)           |                          |
| Si - Characterisation                          | SiWaScan                               | M-104    | Gaute Stokkan (SINTEF)           |                          |
| Si - Characterisation                          | micro cracks characterisation          | M-104    | <a href="#">Kai Erik Ekstrøm</a> |                          |
| Si - Characterisation Crystal defect mesurment | PVSCAN 6000                            | M-104    | Gaute Stokkan (SINTEF)           |                          |
| Si - Characterisation Density Imaging          | CDI-Carrier                            | M-104    | Gaute Stokkan (SINTEF)           |                          |

## Electrical resistivity measurement

| Type of equipment                | Name of equipment | Location | Contact person                     | Link to more information |
|----------------------------------|-------------------|----------|------------------------------------|--------------------------|
| Resistivity measurement (metals) | Sigmascope        | E-508    | <a href="#">Trygve L. Schanche</a> |                          |